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VASCULAR PLANTS OF GLACIER NATIONAL PARK, BRITISH COLUMBIA, CANADA

Erich Haber & James H. Soper

Botany Division
National Museum of Natural Sciences
National Museums of Canada
Ottawa, Ontario
K1A 0M8

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ABSTRACT

Glacier National Park is located within an interior wet belt centred in the Selkirk Mountains. Two forest types are represented in the park. The vegetation of the mountain slopes and to a lesser degree the valley bottoms forms a part of the Interior Subalpine Forest and consists primarily of a variety of Cordilleran species. The Northern Columbia Forest is represented in the valley of the Beaver River. In the latter, the species consist primarily of a few conspicuous western coastal elements which also overlap with the dominant species of the Interior Subalpine Forest in the valley of the Illecillewaet River. A floristic survey of trails, roadsides and selected limestone habitats has yielded a listing of approximately 330 species of vascular plants. The greatest similarity with the flora of the nearby Rockies occurs in areas of limestone that crop out within the generally acidic bedrock prevalent throughout Glacier. In these calcareous habitats occur some of the common Rocky Mountain species that are absent elsewhere in Glacier. Twenty-five calciphiles are recorded for the park.

Key words: vascular plants; floristics; Glacier National Park, B.C.

RESUME

Circonscrit par la chaîne des montagnes Selkirk, le Parc national Glacier est situé dans une région humide à l'intérieur de la Colombie-Britannique. On trouve dans ce parc deux genres de forêt. La végétation des versants des montagnes et des vallées, mais dans des proportions moindres, forme une partie de la forêt Subalpine intérieure qui consiste principalement en un apport des espèces de la Cordillère. La forêt Columbia nord se retrouve dans la vallée de la rivière Beaver, où les essences forestières consistent principalement en quelques éléments caractéristiques de la région côtière occidentale qui se mélangent aux principales essences de la forêt subalpine intérieure dans la vallée de la rivière Illecillewaet. Un inventaire floristique effectué sur des pistes, sur le bord des routes et dans des habitats calcaires bien définis a contribué a l'élaboration d'une liste d'environ 330 espèces de plantes vasculaires. La similarité la plus remarquable de cette flore avec celle des Rocheuses avoisinantes se situe sur les affleurements calcaires de la roche-mère acidique qui abonde dans le parc. Dans ces habitats calcaires on retrouve plusieurs espèces communes dans les Rocheuses qui ne se rencontrent pas ailleurs dans le parc. On a dénombré 25 de ces espèces calcicoles.

Mots clés: plantes vasculaires; floristique; Parc national Glacier, C.-B.

INTRODUCTION

Glacier National Park encompasses an area of approximately 1295 km^2 (500 square miles) centred around Rogers Pass (51^{o} 17' N, 117^{o} 30' W) in southeastern British Columbia (Fig. 1). It is nearly bisected by the Canadian Pacific Railway and the Trans-Canada Highway. The park, set in rugged, mountainous terrain, includes numerous scenic peaks, several ice-fields and luxuriant forests in the valleys and on the lower portion of the slopes.

Situated primarily within the Selkirk Mountains and fringed by the Purcell Mountains along the eastern border, Glacier lies within rock formations considerably older than those of the nearby Rockies to the east (Baird 1971). The most abundant rock types found in Glacier are the various quartzites which are interspersed with zones of slate, schist, and conglomerate. The first two of these are the result of metamorphic processes which have made them resistant to weathering. The soils formed from such primarily siliceous parent materials tend to be acidic in nature. In this respect, the substrate for plant growth differs fundamentally from that in the Rockies where calcareous soils predominate. Soluble limestone, however, occurs as localized outcrops in Glacier and is particularly evident at such places as Cougar and Fidelity Mountains.

The character of the vegetation in Glacier is influenced not only by the nature of the substrate but also by the moist climate. Pacific air masses moving eastward release their moisture on the slopes of the Selkirk and Purcell mountain ranges within an interior wet belt located in the "Big Bend" of the Columbia River. The mean annual total precipitation is approximately 149 cm (59 in), including 9.7 m (32 ft) of snow (Canadian Normals, 1973).

Because of the rugged nature of the Selkirks and the luxuriance of the vegetation that covers their slopes and valleys, these mountains became a mecca for mountaineers and naturalists following the completion of the Canadian Pacific Railway over the Rogers Pass route in 1885. Accommodation was available at Glacier House, a hotel near the foot of the Illecillewaet Glacier (Loc. 4, Fig. 1); it provided a means of ready access to nearby forests and peaks. With the re-routing of the C.P.R. following the completion of the Connaught Tunnel in 1916, the hotel was bypassed and the number of visitors declined. The completion of the Trans-Canada Highway through Rogers Pass in 1962 again brought increasing numbers of visitors to the park. A campsite near the remains of Glacier House affords access to well developed trails, the legacy of an earlier era.

In spite of the work of several professional botanists, biologists and geographers, documentation of Glacier's flora in published form is only fragmentary. The tabulated checklist of vascular plants presented in this paper is intended to serve as a preliminary inventory of the flora of Glacier National Park. It is considered to be most comprehensive for the regions centred around the trails at Rogers Pass, Fidelity Mountain, along the Trans-Canada Highway, and for portions of the Beaver

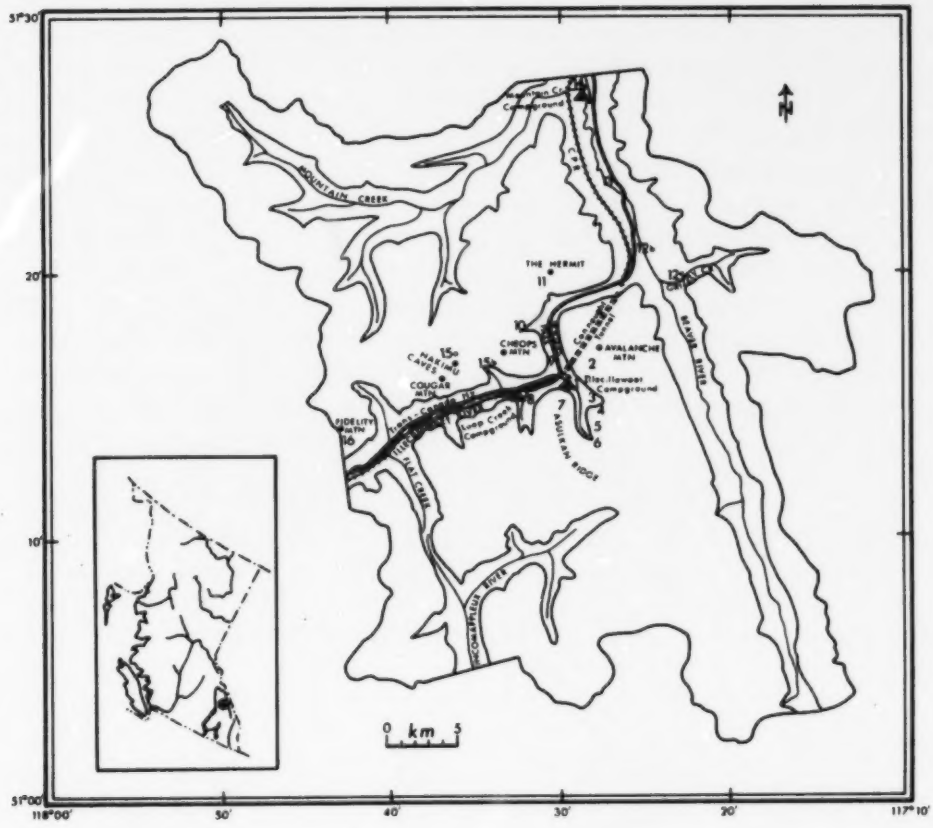

Figure 1. Glacier National Park, B.C. - Geographical location (inset) and primary collection sites (cf. Table 1). Valley outlines are based on the 1525 m (5000 ft) contour interval.

River valley. Undoubtedly more species will be added when the park's interior is surveyed in greater detail.

REVIEW OF BOTANICAL ACTIVITY

A historical and bibliographical review of botanical work in Glacier National Park has already been compiled by Marsh (1970). The following synopsis touches on the highlights that are relevant to the compilation of a floristic inventory of the park.

In 1885, at the time of the railway construction, John Macoun camped at Rogers Pass and made what appear to be the earliest botanical collections in the Selkirks. In his autobiography, he recalled trips to the summit of Avalanche Mountain, up the slope of Cheops Mountain (apparently along the course taken by the present Balu Pass Trail), and up to the vicinity of Swiss Glacier in the Hermit Range (Macoun 1922). Representative specimens collected by Macoun in the "Selkirk Range" between the 18th and 24th of August, 1885, are filed in the National Herbarium (CAN) at Ottawa. Other Macoun specimens in the herbarium represent collections made during the years 1890, 1891, and 1904, primarily at

Rogers Pass, Glacier Hotel and the Asulkan Glacier. In his report on the natural history of the Selkirks, he reviewed some of the common species that occur from the forested river valleys to the alpine meadows (Macoun 1905).

In the National Herbarium there are also specimens received from the Academy of Natural Sciences at Philadelphia which record visits to Glacier and the Asulkan Valley in 1906 by Stewardson Brown. In 1913 and in 1916, M.O. Malte, Macoun's successor as Chief Botanist at the National Museum, also made collections at Glacier.

Professor F.K. Butters of the University of Minnesota conducted a more detailed floristic study of the Selkirks over a period of many years (Butters 1914a, 1914b, 1932). Butters noted that the apparently striking difference between the flora of the Selkirks and that of the Rockies is due primarily to the abundance of a few conspicuous far western species in the Selkirks and the absence or restricted occurrence there of some of the common elements from the Rockies. He concluded that this difference between the floras of these two regions could be attributed only in part to the differences in climate. The general occurrence of acidic soils in the Selkirks is also a factor influencing the composition of the flora and when a substrate similar to those in the Rockies does occur, as on limestone outcrops such as those at Cougar Valley, the floras also are similar. Although Butters never published a complete list of his collections from the Selkirks, he commented on the remarkably limited flora of the area (Butters 1932). After many years of collecting in the vicinity of Glacier, he had found only 262 species and estimated that the flora of the region probably contained fewer than 300 species.

More limited observations on the Selkirks made by C.H. Shaw and published posthumously (Shaw 1916) dealt with the characteristics of the forests and included a list of a few of the common trees, shrubs and herbs.

In 1971 Peter van Leusden, a park naturalist at Glacier National Park, prepared a checklist for Glacier in which about 170 species were listed. A separate list also compiled in 1971 and based on collections made in 1969 by Soper, Szczawinski and Shchepanek along the Balu Pass Trail and in Cougar Valley added 50 species for the park. The two lists were combined in 1972 as a working list for the survey by Haber and Shchepanek. This survey (Haber, 1973) concentrated on the vegetation along portions of nine trails in the Rogers Pass area, parts of Beaver Valley, and also on roadside and campground habitats. The resulting report, submitted to Parks Canada in 1973, contained a general discussion of the forests and of selected habitats as well as an annotated checklist of the plants collected during the survey, incorporating all previous collections by Soper *et al*. Additional records from the 1973 collections by Soper and Given on Fidelity Mountain, near the western boundary of the park, have now been included in the current tabulation giving a total count of approximately 330 species for the

expanded list. Some of the common plants included in this checklist are illustrated in the publication entitled Mount Revelstoke National Park Wild Flowers (Soper & Szczawinski 1976).

THE FORESTS OF GLACIER

Two forest types occur within Glacier National Park. The forest of the mountain slopes lying above the 1100 to 1220 m level (3600-4000 ft) comprises the Interior Subalpine Section of the Subalpine Forest Region (Rowe 1972). Within the framework of the biogeoclimatic classification of British Columbia by Krajina (1965), this same forest is considered to lie between 1280 and 2280 m (4200-7500 ft) and is classified as the Engelmann Spruce-Subalpine Fir Zone of the Canadian Cordilleran Subalpine forest. The Columbia Forest Region (Rowe 1972) is represented in Glacier by the Northern Columbia Section which extends into the valley of the Beaver River from its main area of occurrence along the Columbia River. As classified by Krajina (1965), this forest type is recognized as the Interior Western Hemlock Zone of the Canadian Cordilleran Forest.

INTERIOR SUBALPINE FOREST

The dominant forest type within Glacier National Park is the Interior Subalpine Forest. The trails radiating from the Illecillewaet Campground-Rogers Pass area lead primarily through stands of this forest type except along their lower limits where there is an area of overlap with species of the Northern Columbia Forest. Krajina (1959) listed a substantial number of the vascular plants found characteristically in this forest zone in Britis' Columbia, including some of the bryophytes and lichens. At Glacier, the dominant trees characterizing this forest are Engelmann Spruce (*Picea engelmannii*) and hybrids of that species with White Spruce (*P. glauca*), Alpine Fir (*Abies lasiocarpa*) and Mountain Hemlock (*Tsuga mertensiana*). Scattered throughout the forest but generally above 1370 m (4500 ft) is Whitebark Pine (*Pinus albicaulis*). This species is fairly common along the Avalanche Crest Trail, although a mixture of Engelmann Spruce, Alpine Fir and Mountain Hemlock extends to the valley bottoms at approximately 1200 m (4000 ft) in the Rogers Pass area. This general admixture of the three dominant tree species changes abruptly on steeper slopes between 1500 and 1600 m (4900-5200 ft) as along the Hermit Hut and Marion Lake-Abbott Ridge Trails. Within these altitudinal limits, Mountain Hemlock forms dense stands 15-25 m (50-80 ft) tall. With increasing elevation tree height is reduced although abundance of this species remains high up to tree line. At tree line, which may range between 2000 and 2130 m (6500-7000 ft) depending on slope and exposure, the dominant species are Alpine Fir and Mountain Hemlock.

Distinguishing the Interior Subalpine Forest from the Northern Columbia Forest by species other than the constituent trees is a difficult task. The undergrowth consists basically of the same species with only a few suitable as zonal plant indicators (*sensu* Krajina,

1965). The following list includes some of the most common species that occur in the Interior Subalpine Forest in the Rogers Pass - Illecillewaet Campground area of Glacier. A few plants such as those in the genera *Heracleum, Leptarrhena, Mitella, Osmorhiza, Tellima,* and *Valeriana* are species of moist clearings and open areas beside the trails.

Ferns: *Athyrium felix-femina, Dryopteris assimilis, Gymnocarpium dryopteris, Polystichum lonchitis.*

Shrubs: *Menziesia ferrunginea* var. *glabella, Rhododendron albiflorum, Ribes lacustre, R. laxiflorum, Sambucus racemosa* var. *melanocarpa, Sorbus sitchensis, Vaccinium membranaceum.*

Herbs: *Actaea rubra, Clintonia uniflora, Cornus canadensis, Goodyera oblongifolia, Heracleum spondylium* subsp. *montanum, Listera cordata, Leptarrhena pyrolifolia, Mitella breweri, M. pentandra, Orthilia secunda, Osmorhiza purpurea, Smilacina racemosa, Streptopus roseus, S. streptopoides, Tellima grandiflora, Tiarella unifoliata, Valeriana sitchensis.*

NORTHERN COLUMBIA FOREST

The second forest type represented in the park is the Northern Columbia Forest, an interior wet-belt forest similar to the coastal forest in many of its constituent species. A list of the climatic and edaphic climax species together with some associated woody plants was given by Krajina (1959).

The Northern Columbia Forest of the Beaver River Valley as seen along the Bald Mountain-Beaver River Trails is quite different from the Interior Subalpine Forest of the mountain slopes. The dominant tree species is Western Hemlock (*Tsuga heterophylla*) with Western Red Cedar (*Thuja plicata*), Western White Pine (*Pinus monticola*), Douglas Fir (*Pseudotsuga menziesii* var. *glauca*) and Engelmann Spruce common and scattered throughout. Although Western Hemlock has diameters at breast height (d.b.h.) generally under 60 cm (24 in) and Western Red Cedar is common as saplings and smaller trees (d.b.h. 40 cm (16 in)), specimens of Western White Pine were observed with diameters of 120 cm (48 in) and Douglas Fir and Engelmann Spruce up to 90 cm (36 in). The plant cover on the forest floor consists primarily of a mat of species of feather mosses and in contrast to the Interior Subalpine Forest elsewhere in the park, ferns are only infrequently found and then as small patches or scattered plants. A few shrubs and herbs are characteristically seen only within this forest region, although a number of plants primarily coastal in their distribution are also found along the lower slopes in the Rogers Pass area and indeed most of the understorey plants from the Interior Subalpine Forest also occur in the Northern Columbia Forest.

The Northern Columbia Forest as seen along the Beaver River is characterized most clearly by its tree species and the general nature of the forest such as its relatively open appearance and its carpet of feather mosses. Although the understorey is somewhat sparse, there are certain shrubs and herbs that were either collected only in this forest or were

most abundant there:

Lonicera utahensis, Oplopanax horridus, Paxistima myrsinites, Taxus brevifolia, Aralia nudicaulis, Corallorhiza mertensiana, C. trifida, Disporum hookeri, Listera convallarioides.

Many other species were collected only in the Beaver River Valley but these were generally either adventives or plants which could be considered as edaphic climax species (*sensu* Krajina, 1959). Most of the latter occurred along the riverbanks.

The most luxuriant tree growth seen was along the river bottomland at Bear Creek Falls. Specimens of Western Red Cedar, Western Hemlock, Engelmann Spruce and Black Cottonwood (*Populus balsamifera* subsp. *trichocarpa*) with trunk diameters of 9-12 dm (36-48 in) are common there. This interior wet-belt forest maintains its distinctive character primarily in the Beaver River Valley. In places such as the Mountain Creek Campground in the valley of the Beaver River south of the northeastern park boundary, a mixed stand of Lodgepole Pine (*Pinus contorta* var. *latifolia*), Engelmann Spruce, Alpine Fir, Western White Pine and Black Cottonwood exhibits the characteristic appearance of a regenerating forest. Fires were common occurrences during the years of railway construction. Western Hemlock and Western Red Cedar are present only as young seedlings but this may be indicative of the return of the forest to the more typical species mixture of the Northern Columbia Forest association.

At Rogers Pass and along the valley of the Illecillewaet River a mixture of species from the Interior Subalpine and Northern Columbia Forests occurs. Species of the Northern Columbia forest such as Western Hemlock, Western Red Cedar and Devil's club (*Oplopanax horridus*) generally reach their upper limits at approximately 1460 m (4800 ft) on the lower slopes. Occasionally, specimens of Western Hemlock occur at elevations as high as 1830 m (6000 ft), as along the Glacier Crest Trail, and dwarfed saplings of Western Red Cedar reach elevations of 1620 m (5300 ft) in the Asulkan Valley. Intermixed with these and other wet-belt species are elements of the Interior Subalpine Forest such as Alpine Fir, Mountain Hemlock, Engelmann Spruce and White Rhododendron (*Rhododendron albiflorum*), which extend to the foot of the slopes at approximately 1200 m (4000 ft).

THE ALPINE ZONE

The tree line at Glacier occurs approximately between 2000 and 2130 m (6500-7000 ft). Only where the slope changes abruptly is there a sharp break between the upper limit of tree growth and the treeless alpine zone. Factors such as slope, exposure, drainage and substrate which determine the fluctuating elevation of the tree line are also instrumental in shaping the mosaic pattern formed by the alpine communities. The plants of these communities are almost exclusively perennials which can persist vegetatively even though their flower and seed production may be drastically reduced or precluded during the short growing seasons following particularly severe winters.

Many different individual alpine habitats could be described and their species listed. However, since most of the plants are not so limited by their requirements that they occur only in one specific habitat, several broad habitat groupings are presented below together with some of the more common species that are representative of these habitats in Glacier:

Rock outcrops, talus slopes and exposed ridges

Antennaria alpina, Arabis drummondii, Arenaria capillaris, A. rubella, Crepis nana, Cryptograma crispa, C. stelleri, Draba lonchocarpa, Dryas hookeriana, Salix arctica, S. nivalis, Saxifraga bronchialis, S. oppositifolia, Sibbaldia procumbens, Silene acaulis

Sunny well-drained slopes

Cassiope mertensiana, C. tetragona, Phyllodoce empetriformis, P. glanduliflora

Seepage and snow-bed runoff slopes

Caltha leptosepala, Claytonia lanceolata, Erythronium grandiflorum, Luetkia pectinata, Ranunculus eschscholtzii

Sheltered alpine and subalpine meadows and stream banks

Anemone occidentalis, A. parviflora, Epilobium alpinum, Erigeron peregrinus, Leptarrhena pyrolifolia, Ligusticum canbyi, Mimulus tilingii, M. lewisii, Parnassia fimbriata, Pedicularis bracteosa, Petasites frigidus, Platanthera hyperborea, Saxifraga lyallii, Senecio triangularis, Trollius laxus, Valeriana sitchensis, Veratrum viride

The habitats and their component species are given more or less in sequence from the drier, exposed upper elevations to progressively more moist, lower elevations. Most of the species listed for the meadows and stream banks also occur in suitable open, moist habitats along streams and trailside clearings throughout the forests down to the valley meadows.

COLLECTION LOCALITIES

The major part of Glacier National Park is underlain by bedrock of the Hamill Group which consists primarily of quartzite interspersed with slate and conglomerate. These weather-resistant rocks are particularly evident in the Rogers Pass area as the rugged mountain massifs on both sides of the Trans-Canada Highway. It is in this region and on this bedrock type that the majority of the trails are located. Table 1 includes a list of all the trails and other main collection localities or habitats which were surveyed. Their location in Glacier is indicated in Fig. 1.

ROGERS PASS

Since most of the botanical activity in Glacier has centred around the environs of Rogers Pass, it is not surprising that more species are listed as occurring in this area (Fig. 2) than in any of the others. The diversity in species composition for Glacier, though not very great, is increased by the presence of different habitats on limestone outcrops. These occur as localized pockets as on the exposed bedrock below the Illecillewaet Glacier as evidenced by the presence of the calciphiles *Equisetum variegatum, Pinguicula vulgaris,* and *Adiantum pedatum* var. *aleuticum* or as

Figure 2. Rogers Pass as seen from Glacier Crest Trail looking northward toward the Hermit Range.

larger exposures such as those in the upper Cougar Valley and at Fidelity Mountain. Conditions for luxuriant plant growth in the valley of the Beaver River are ensured both by the high precipitation of the region and by the influx of nutrients supplied by the periodic deposition of sediment along the riverbanks. Upwelling of lime-rich waters also provides nutrients and habitats for characteristic fen species.

COUGAR VALLEY

The Nakimu Formation consists of a bluish-gray limestone which crops out prominently on the northeast slope of Cougar Mountain. A 360 m thickness of vertically-dipping limestone beds in the Nakimu Caves area extends eastwards under the mountains of Rogers Pass to re-appear along the lower slopes of Beaver Valley. The caves themselves consist of extensive solution caverns formed over many years by Cougar Brook seeping through the numerous fissures of the Cougar Mountain Fault.

The significance of this and similar outcrops in relation to the local occurrence and diversity of the flora was recognized by Butters (1914b) who

compiled a list of plants collected on the limestone ledges in Cougar Valley. When those plants that occur elsewhere in Glacier, as judged from his comments and specimens and our own records, are removed from this list of thirty species, four verified specimens remain as additional records from the area. A review of our collections from Glacier indicates that twenty-three taxa were found to occur only in the upper Cougar Valley; in addition, ten others were collected either at Cougar Valley and Fidelity Mountain (8 species) or at Cougar Valley and the Beaver River Fen (2 species). On the basis of their habitat preferences, not only within Glacier but also as a general feature throughout their range, at least eleven calciphiles can be identified as occurring in the upper Cougar Valley: *Asplenium trichomanes, A. viride, Cryptogramma stelleri, Cystopteris fragilis, Dryopteris filix-mas, Anemone multifida, A. parviflora, Dryas drummondii, Saxifraga aizoides, S. oppositifolia* and *Zigadenus elegans*.

FIDELITY MOUNTAIN

Fidelity Mountain lies at the western boundary of Glacier National Park. It is situated within an area of bedrock consisting mainly of black argillite and dark limestone (cf. Okulitch 1949, fig. 1). The site is of particular interest because it contrasts lithologically with the main area of the park, just a few miles to the northeast, which consists primarily of quartzite and phyllite.

The specimens collected by Soper and Given in 1973 serve as the basic data for this locality. Botanical activity was confined to the forests along the road which leads from the Trans-Canada Highway to the Avalanche Research Station near the summit and to the slopes above the station, particularly in the basin immediately southeast of the summit (fig. 3). The upper edge of continuous forest is at approximately 1830 m (6000 ft.); collections were made from there to a maximum elevation of about 2380 m (7800 ft) just south of the summit. The Avalanche Research Station at 1860 m (6100 ft) is accessible on foot or by a four-wheel drive vehicle via the steep switch-back road. From the station it is only a few minutes walk to the rim of the basin (Fig. 4). In spite of this, no previous collections have been seen from the basin.

The alpine vegetation of Fidelity Mountain is rich and varied. Among the collections from this locality were fifteen new records for the park as well as six species of calciphiles. One of the calciphiles (*Arabis drummondii*) was unique to the area. The finding of fifteen species previously unrecorded for Glacier and representing the efforts of parts of two days of collecting may indeed be a reflection of the uniqueness of the area. These same fifteen species have as yet not been reported from the Nakimu limestone at Cougar Valley in spite of the more intensive botanical activity in the area by several collectors over the course of many seasons. The occurrence of an assemblage of species at both Fidelity Mountain and Cougar Valley (38 species) which have not been found elsewhere in the park attests to the important influence of local variations in substrates on the

Figure 3. Lower Cougar Valley from 1220 m (4000 ft), looking northwest. The Nakimu Caves and upper valley lie beyond the ridge crossing the centre of view. In the foreground are the lower slopes of Cougar Mountain (left) and Cheops Mountain (right).

Figure 4. View looking northwest toward escarpment from the basin lying southeast of Fidelity Peak (to left of photograph).

distribution of plant species. The differences in species composition between these two areas is probably a reflection, at least in part, of the greater diversity of habitats at Fidelity Mountain. At this locality, extensive exposures and scree slopes of graphitic schist occur in addition to the limestone outcrops.

BEAVER RIVER FEN LOCALITY

As outlined by Okulitch (1949), the rocks underlying the valley of the Beaver River consist of phyllite and shale interbedded with sandy and quartzitic layers together with some bands of limestone. At the collection site along the Trans-Canada Highway just north of the Beaver River bridge (fig. 5), a luxuriant fen occurs in a region of ground water upwelling. Several holes, ringed by a limey crust and submerged under several centimeters of water, supply the area with a continuous flow of water. The ground water undoubtedly passes through one of the underlying limestone beds.

The main portion of the site consists of a flooded alluvial flat dominated by *Scirpus lacustris* subsp. *glaucus*. Along the periphery of this flat, closest to the highway, a diverse assemblage of flowering herbs, with species of *Carex, Juncus, Eriophorum* and *Equisetum*, grows amid extensive mats of the moisture-loving mosses *Plagiomnium ellipticum* and *Drepanocladus aduncus*. Present, in addition to these two fen indicator mosses, are a number of vascular plants that are usually associated with calcareous habitats: *Carex aurea, C. interior, Drosera anglica, Equisetum variegatum, Lobelia kalmii, Parnassia parviflora, Salix candida, Triglochin palustris, Tofieldia glutinosa, Zigadenus elegans*.

Several other calciphiles were collected in the Beaver River Valley. *Dryas drummondii* grew on a gravel bed next to the fen, while *Shepherdia canadensis* was found along the road to the Mountain Creek Campground.

Of the total of twenty-five species of calciphiles tabulated in the list for Glacier, ten are found in the fen. Eight of these ten are unique to this habitat. The remaining seventeen of the twenty-five species collected exclusively at this site are wetland species presumably with broader habitat tolerances.

ROADSIDE HABITATS

Although weedy plants were commonly observed and collected along the Trans-Canada Highway and along roadsides leading into and around camp areas, no great proliferation of any of these weeds was observed. The most common plants on dry roadsides were White and Yellow Sweet Clover (*Melilotus alba, M. officinalis*), Yarrow (*Achillea millefolium*), and Pineapple Weed (*Chamomilla suaveolens*). Also common along roadsides throughout the park were Red Clover (*Trifolium pratense*), Hybrid Clover (*Trifolium hybridum*), White Clover (*Trifolium repens*), and Fireweed (*Epilobium angustifolium*). Chicory (*Cichorium intybus*) and Wild Barley (*Hordeum jubatum*) were seen only infrequently.

CHECKLIST OF THE VASCULAR PLANTS

The tabulated list of vascular plants is based primarily on the collections

Figure 5. Beaver River alluvial flat and marginal fen (Loc. no. 13) in centre of the foreground. The easterly slopes of the Hermit Range form the background.

made by Soper, Szczawinski & Shchepanek in 1969, Haber & Shchepanek in 1972 and Soper & Given in 1973. A complete set of these collections is housed in the National Herbarium of Canada (CAN), Ottawa. Duplicate sets of most of these collections were distributed to the B.C. Provincial Museum (V) at Victoria or to the Parks Canada headquarters for Mount Revelstoke-Glacier Parks at Revelstoke, B.C.

The collection localities listed in Table 1 have been grouped into collection areas to combine specimen data from sites occurring within the same vegetational type (e.g., Rogers Pass, Beaver Valley) and to maintain separately the areas where local variations in substrate or habitat occur (e.g., Fidelity Mtn., Cougar Valley, Beaver River Fen). Included in the Rogers Pass category are the collections from three trails (Nos. 9, 10, 11) beginning at the Trans-Canada Highway near the pass as well as the trails and campsites at the Illecillewaet and Loop Creek Campgrounds. Collections from the Bald Mountain Trail, Mountain Creek Campground and roadsides along the Beaver River are combined under Beaver River Valley.

Weeds and native species not seen at the main localities were also collected at various points along the Trans-Canada Highway. These are tabulated in the checklist under Rogers Pass or Beaver Valley. The names for all trails are those used in the Trail Guide for Glacier National Park, issued by Parks Canada. Botanical nomenclature, with some exceptions, follows that used by Taylor and MacBryde (1977).

The types of specimen data recorded are as follows:

O - collections, National Herbarium of Canada, Ottawa, Ont.

M - F.K. Butters' collections, University of Minnesota Herbarium, Minneapolis, Minn.

P - collections, Parks Canada Herbarium, Revelstoke, B.C.

s - sight records (field observations by E. Haber, J. H. Soper, and D.R. Given)

* - species considered to be calciphiles as determined primarily by consulting habitat preferences published by Fernald (1907, 1950)

TABLE 1 - COLLECTION LOCALITIES IN GLACIER NATIONAL PARK

1. Illecillewaet Campground - E. Haber & M.J. Shchepanek, 19 July 1972; roadside and grassy slopes at entrance, 1220 m
2. Avalanche Crest Trail - E. Haber & M.J. Shchepanek, 28 July 1972; Illecillewaet Campground to Avalanche Crest, 1235 - 2315 m
3. Sir Donald Trail - E. Haber & M.J. Shchepanek, 28 July 1972; Illecillewaet Campground to avalanche site, 1235 - 1370 m
4. Great Glacier Trail - E. Haber & M.J. Shchepanek, 21 July 1972; Illecillewaet Campground to rock outcrop below glacier, 1235 - 1615 m
5. Glacier Crest Trail - E. Haber & M.J. Shchepanek, 24 July 1972; Illecillewaet Campground to 1830 m
6. Asulkan Valley Trail - E. Haber & M.J. Shchepanek, 22 July 1972; Illecillewaet Campground to lateral moraine and talus slope at creek crossing, 1235 - 1770 m
7. Marion Lake and Abbott Ridge Trail - E. Haber & M.J. Shchepanek, 25 July 1972; Illecillewaet Campground to bouldery overview above Marion Lake, 1235 - 1830 m
8. Loop Creek Campground - E. Haber & M.J. Shchepanek, 29 July 1972; roadside and nature trail on old railway embankment, 1145 - 1175 m
9. Abandoned Rails Trail - E. Haber & M.J. Shchepanek, 26 July 1972; wooded area at Rogers Pass monument, 1326 m
10. Balu Pass Trail - (a) J.H. Soper, M.J. Shchepanek & A.F. Szczawinski, 16 Aug. 1969; from base at hotel to 1465 m
    (b) E. Haber & M.J. Shchepanek, 19 July 1972; same area covered as above.
11. Hermit Hut Trail - E. Haber & M.J. Shchepanek, 19 July 1972; from highway to alpine meadows, 1280 - 2040 m
12. Bald Mountain - Beaver River Trails - E. Haber & M.J. Shchepanek,
    (a) 27 July 1972 - from quarry at highway on east side of Beaver R. along bulldozed trail connecting with Bald Mountain Trail as far as the Grizzly Creek crossing, 885 - 1065 m
    (b) 30 July 1972 - from official trail start at highway to wooded riverside flats near bridge crossing the Beaver R., 915 - 855 m
13. Beaver River Fen - E. Haber & M.J. Shchepanek, 30-31 July 1972; inundated roadside alluvial flat 8.9 km south of northern park boundary, 870 m
14. Mountain Creek Campground - E. Haber & M.J. Shchepanek, 29-30 July 1972; gravelly roadside, riverside thickets and wooded campgrounds, 870 m

15. Cougar Valley - (a) J.H. Soper, M.J. Shchepanek & A.F. Szczawinski, 18 Aug. 1969; from highway to upper valley, 1095 - 1890 m
(b) E. Haber & M.J. Shchepanek, 31 July 1972; lower wooded valley to 1235 m

16. Fidelity Mountain - J.H. Soper and D.R. Given
(a) 17 August 1973 - along switch-back road from highway to Avalanche Research Station (980 - 1900 m) and above on open slopes and ridges to 2100 m
(b) 21 August 1973 - primarily above treeline in the basin southeast of Fidelity Peak, 1830 - 2380 m

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CHECKLIST OF VASCULAR PLANTS

	Collection Areas				
	Rogers Pass	Cougar Valley	Fidelity Mtn.	Beaver R. Valley	Beaver R. Fen
PTERIDOPHYTES					
EQUISETACEAE					
Equisetum arvense L.	0	s	s	s	s
E. fluviatile L.	-	-	-	s	0
**E. variegatum* Schleich.	0	-	0	-	0
LYCOPODIACEAE					
Lycopodium alpinum L.	0	-	0	-	-
L. annotinum L.	0	-	-	s	-
L. complanatum L.	s	P	-	0	-
L. selago L.	s	-	0	-	-
L. sitchense Rupr.	0	-	0	-	-
OPHIOGLOSSACEAE					
Botrychium simplex Hitchc.	-	-	0	-	-
B.virginianum (L.) Sw.	-	-	-	-	0
POLYPODIACEAE					
**Adiantum pedatum* L. var. *aleuticum* Rupr.	P	-	-	-	-
**Asplenium trichomanes* L.	-	M	-	-	-
**A. viride* Huds.	-	M	-	-	-
Athyrium filix-femina (L.) Roth	0	s	-	0	-
Cryptogramma crispa (L.) R.Br. var. *acrostichoides* (R.Br.) C.B. Clarke	0	-	0	-	-
**C. stelleri* (S.G. Gmel.) Prantl	-	0	0	-	-
**Cystopteris fragilis* (L.) Bernh.	-	0	0	0	-
Dryopteris assimilis S. Walker	0	s	s	s	-
**D. filix-mas* (L.) Schott	0	0	-	-	-
Gymnocarpium dryopteris (L.) Newm.	0	0	s	s	-
Polystichum lonchitis (L.) Roth	0	0	0	-	-
Pteridium aquilinum (L.) Kuhn var. *pubescens* Underw.	s	s	-	s	-

	Collection Areas				
	Rogers Pass	Cougar Valley	Fidelity Mtn.	Beaver R. Valley	Beaver R. Fen
SELAGINELLACEAE					
Selaginella densa Rydb. var. *scopulorum* (Maxon) Tryon	0	0	-	-	-
GYMNOSPERMS					
CUPRESSACEAE					
Juniperus communis L. var. *montana* Ait.	-	-	-	P	-
Thuja plicata Donn ex D. Don	0	s	s	s	s
PINACEAE					
Abies lasiocarpa (Hook.) Nutt.	0	s	s	s	-
Picea engelmannii Parry (including hybrids with *P. glauca*)	0	s	-	s	s
Pinus albicaulis Engelm.	0	s	-	s	s
P. contorta Dougl. ex Loudon var. *latifolia* Engelm.	-	-	-	0	-
P. monticola Dougl. ex D. Don	-	s	s	0	-
Pseudotsuga menziesii (Mirb.) Franco var. *glauca* (Beissn.) Franco	-	-	s	0	-
Tsuga heterophylla (Raf.) Sarg.	0	s	0	s	-
T. mertensiana (Bong.) Carr.	0	s	0	-	-
TAXACEAE					
Taxus brevifolia Nutt.	s	0	-	0	-
ANGIOSPERMS					
ACERACEAE					
Acer glabrum Torr. var. *douglasii* (Hook.) Dipp.	s	s	-	s	-
APIACEAE					
Cicuta douglasii (DC.) Coult. & Rose	-	-	-	-	0

	Collection Areas				
	Rogers Pass	Cougar Valley	Fidelity Mtn.	Beaver R. Valley	Beaver R. Fen
Heracleum sphondylium L. subsp. *montanum* (Gaud.) Briq. (*H. lanatum* Michx.)	0	-	0	s	-
Ligusticum canbyi Coult. & Rose	0	s	0	s	-
Osmorrhiza purpurea (Coult. & Rose) Suksd.	0	s	-	0	-
APOCYNACEAE					
Apocynum androsaemifolium. L.	-	-	-	0	-
ARACEAE					
Lysichiton americanum Hulten & St. John	-	-	-	s	-
ARALIACEAE					
Aralia nudicaulis L.	-	-	-	0	-
Oplopanax horridus (J.E. Smith) Miq.	0	s	s	s	-
ASTERACEAE					
Achillea millefolium L.	S	-	-	0	-
Adenocaulon bicolor Hook.	-	-	-	0	-
Agoseris aurantiaca (Hook.) Greene	-	-	-	0	-
Anaphalis margaritacea (L.) Benth. & Hook.	s	-	0	s	-
Antennaria alpina (L.) Gaertn.	-	-	0	-	-
A. corymbosa E. Nels.	-	0	-	-	-
A. lanata (Hook.) Greene	0	-	0	-	-
A. rosea Greene	0	-	-	-	-
Arctium sp. (vegetative)	s	-	-	-	-
Arnica amplexicaulis Nutt.	M	-	-	-	-
A. cordifolia Hook.	-	-	0	-	-
A. diversifolia Greene	0	-	-	-	-
A. latifolia Bong.	0	0	-	s	-
A. mollis Hook.	-	0	0	-	-
Artemisia michauxiana Bess.	-	0	-	0	-
Aster engelmannii (D.C. Eat.) A. Gray	-	0	-	-	-

	Collection Areas				
	Rogers Pass	Cougar Valley	Fidelity Mtn.	Beaver R. Valley	Beaver R. Fen
A. modestus Lindl.	-	0	-	-	0
A. sibiricus L.	-	-	-	0	-
Chamomilla suaveoleus (Pursh) Rydb. (*Matricaria matricarioides* (Less.) Porter)	-	-	-	0	-
Leucanthemum vulgare Lam.	-	-	-	0	-
Cichorium intybus L.	-	-	-	s	-
Cirsium arvense (L.) Scop.	-	-	-	0	-
C. brevistylum Cronq.	-	-	-	0	-
C. hookerianum Nutt.	-	0	-	-	-
C. vulgare (Savi) Tenore	-	-	-	0	-
Conyza canadensis (L.) Cronq.	-	-	-	0	-
Crepis nana Rich.	-	-	0	-	-
C. tectorum L.	-	-	-	0	-
Erigeron acris L. var. *asteroides* (Andrs.) Bess.	-	0	-	0	-
var. *debilis* Gray	-	-	0	-	-
E. aureus Greene	0	-	-	-	-
E. humilis Grah.	-	0	-	-	-
E. peregrinus (Pursh) Greene subsp. *callianthemus* (Greene) Cronq.	0	0	0	s	-
Hieracium albiflorum Hook.	0	s	-	0	-
H. gracile Hook.	0	s	0	-	-
Lactuca biennis (Moench) Fern.	-	-	-	0	-
Petasites frigidus (L.) Fries	0	-	0	-	-
Senecio pauperculus Michx.	s	0	-	-	0
S. triangularis Hook.	0	-	0	s	s
Solidago canadensis L. var. *subserrata* (DC.) Cronq.	-	-	-	0	-
S. multiradiata Ait. var. *scopulorum* Gray	-	0	-	0	-
Sonchus arvensis L. subsp. uliginosus (Bieb.) Nyman	-	-	-	0	-
S. asper (L.) Hill	-	-	-	0	-

	Collection Areas				
	Rogers Pass	Cougar Valley	Fidelity Mtn.	Beaver R. Valley	Beaver R. Fen
Taraxacum laevigatum (Willd.) DC.	-	-	-	0	-
T. lyratum (Ledeb.) DC.	-	0	-	-	-
BETULACEAE					
Alnus incana (L.) Moench	-	-	-	0	0
A. sinuata (Regel) Rydb.	0	s	0	s	0
Betula papyrifera Marsh.	0	s	s	s	-
BORAGINACEAE					
Myosotis sylvatica Hoffm. var. *alpestris* (F.W. Schmidt) Koch	0	-	-	-	-
BRASSICACEAE					
**Arabis drummondii* Gray	-	-	0	-	-
A. hirsuta (L.) Scop.	-	-	-	0	-
A. holboellii Hornem. var. *retrofracta* (R.C. Grah.) Rydb.	-	-	-	0	-
A. lemmonii Wats.	-	-	0	-	-
A. lyallii Wats.	M	M	s	-	-
A. lyrata L.	0	0	-	-	-
Capsella bursa-pastoris (L.) Medik.	-	-	-	0	-
Cardamine oligosperma Nutt.	0	0	0	-	-
C. pensylvanica Muhl. ex Willd.	0	-	-	-	-
Draba crassifolia R.C. Graham	-	0	-	-	-
D. lonchocarpa Rydb.	-	M	0	-	-
D. praealta Greene	-	0	-	-	-
D. stenoloba Ledeb.	0	-	-	-	-
CAMPANULACEAE					
Campanula lasiocarpa Cham.	M	-	-	-	-
C. rotundifolia L.	-	-	-	0	-
**Lobelia kalmii* L.	-	-	-	-	0
CAPRIFOLIACEAE					
Linnaea borealis L.	-	-	-	0	-

	Collection Areas				
	Rogers Pass	Cougar Valley	Fidelity Mtn.	Beaver R. Valley	Beaver R. Fen
Lonicera involucrata (Richards.) Banks	s	-	-	s	0
L. utahensis S. Wats.	-	s	-	0	-
Sambucus racemosa L. var. *melanocarpa* (Gray) McMinn	0	0	s	0	-
Symphoricarpos albus (L.) Blake	-	-	-	0	-
Viburnum edule (Michx.) Raf.	-	-	-	0	-
CARYOPHYLLACEAE					
Arenaria capillaris Poir. subsp. *americana* Maguire	-	-	0	-	-
Arenaria sajanensis Willd.	M	M	-	-	-
Cerastium fontanum Baumg. subsp. *triviale* (Link) Jalas (C. vulgatum L.)	-	M	-	s	-
Minuartia rubella (Wahl.) Hiern. (*Arenaria rubella* (Wahl.) Sm.)	-	-	0	-	-
Sagina saginoides (L.) Karst.	0	0	0	-	-
Silene acaulis (L.) Jacq.	-	-	0	-	-
S. alba (Mill.) Krause (*Lychnis alba* Mill.)	-	-	-	0	-
Spergularia rubra (L.) J. & C. Presl	-	-	-	0	-
Stellaria calycantha (Ledeb.) Bong.	0	s	0	s	-
Vaccaria pyramidata Medik. (*V. segetalis* (Neck.) Garcke ex Asch.)	-	-	-	0	-
CELASTRACEAE					
Paxistima myrsinites (Pursh) Raf.	-	-	-	0	-
CORNACEAE					
Cornus canadensis L.	0	0	0	s	s
C. stolonifera Michx.	-	-	-	0	0

	Collection Areas				
	Rogers Pass	Cougar Valley	Fidelity Mtn.	Beaver R. Valley	Beaver R. Fen
CRASSULACEAE					
Sedum lanceolatum Torr.	-	0	-	-	-
CYPERACEAE					
Carex aquatilis Wahl.	-	-	-	-	0
**C. aurea* Nutt.	-	-	-	-	0
C. brunnescens (Pers.) Poir.	0	-	-	-	-
C. deweyana Schwein.	-	-	-	0	-
C. flava L.	-	-	-	-	0
**C. interior* L.H. Bailey	-	-	-	-	0
C. lenticularis Michx. (Incl. *C. kelloggii* W. Boott)	0	-	0	-	-
C. macloviana D'Urv. subsp. *pachystachya* (Cham. ex Steud.) Hulten	0	-	-	-	-
C. mertensii Prescott	0	0	-	s	-
C.? microptera Mackenzie (immature)	0	-	-	-	-
C.? nigricans C.A. Meyer (immature)	-	-	0	-	-
C.? praticola Rydb. (immature)	0	-	-	-	-
C.? pyrenaica Wahl. (immature)	-	-	0	-	-
C. rostrata Stokes ex With.	-	-	-	-	0
C. spectabilis Dewey	0	-	-	-	-
Eleocharis tenuis (Willd.) Schultes var. *borealis* (Svenson) Gleason	-	-	-	-	0
Eriophorum chamissonis C.A. Meyer	-	-	0	-	-
E. angustifolium Honck.	-	-	0	0	-
E. viridi-carinatum (Engelm.) Fern.	-	-	-	-	0
Scirpus lacustris L. subsp. *glaucus* (Reichenb.) Hartm. (*S. acutus* Muhl.)	-	-	-	-	0

	Collection Areas				
	Rogers Pass	Cougar Valley	Fidelity Mtn.	Beaver R. Valley	Beaver R. Fen
S. microcarpus Presl	-	-	-	-	O
DROSERACEAE					
**Drosera anglica* Huds.	-	-	-	-	O
ELAEAGNACEAE					
**Shepherdia canadensis* (L.) Nutt.	-	-	-	O	-
EMPETRACEAE					
Empetrum nigrum L.	O	-	-	-	-
ERICACEAE					
Cassiope mertensiana (Bong.) G. Don	O	O	O	-	-
C. tetragona (L.) D. Don	M	-	-	-	-
Chimaphila umbellata (L.) Bart.	S	-	-	O	-
Gaultheria humifusa (R.C. Grah.) Gray	O	-	O	-	-
G. ovatifolia Gray	O	S	-	O	-
Hypopytis monotropa Crantz	-	-	-	O	-
Kalmia poliifolia Wang. subsp. *microphylla* (Hook.) Calder & Taylor	O	-	-	-	-
Ledum groenlandicum Oeder	-	-	-	P	-
Menziesia ferruginea Smith var. *glabella* (Gray) Peck	O	-	-	S	-
Moneses uniflora (L.) Gray	O	S	-	O	-
Orthilia secunda (L.) House	O	O	-	O	-
Phyllodoce empetriformis (Sm.) D. Don	O	O	O	-	-
P. glanduliflora (Hook.) Coville	O	-	-	-	-
Pyrola asarifolia Michx. (Incl. *P. bracteata* Hook.)	O	S	-	O	O
P. chlorantha Sw.	-	-	-	O	-
P minor L.	O	O	-	-	-
Rhododendron albiflorum Hook.	O	O	S	S	-
Vaccinium membranaceum Dougl. ex Hook.	O	S	S	S	-

	Collection Areas				
	Rogers Pass	Cougar Valley	Fidelity Mtn.	Beaver R. Valley	Beaver R. Fen
V. ovalifolium J.E. Smith	0	s	s	s	-
GROSSULARIACEAE					
Ribes lacustre (Pers.) Poir.	0	0	-	s	-
R. laxiflorum Pursh	0	s	s	s	-
HYDROPHYLLACEAE					
Phacelia hastata Dougl. ex Lehm.	-	0	-	-	-
P. sericea (R.C. Grah.) Rydb.	0	-	-	s	-
Romanzoffia sitchensis Bong.	-	0	-	-	-
HYPERICACEAE					
Hypericum formosum H.B.K.	0	-	-	-	-
JUNCACEAE					
Juncus acuminatus Michx.	-	-	-	-	0
J. bolanderi Engelm.	-	-	-	-	0
J. drummondii E. Meyer	0	-	0	-	-
J. mertensianus Bong.	-	0	0	-	-
J. parryi Engelm.	0	-	-	-	-
Luzula parviflora (Ehrh.) Desv.	0	s	0	s	-
L. spicata (L.) DC.	0	-	-	-	-
L. wahlenbergii Rupr.	0	-	-	-	-
JUNCAGINACEAE					
Triglochin maritimum L.	-	-	-	-	0
**T. palustris* L.	-	-	-	-	0
LAMIACEAE					
Prunella vulgaris L.	0	-	-	s	-
FABACEAE					
Lupinus burkei S. Wats.	0	-	-	-	-
Medicago lupulina L.	-	-	-	0	-
Melilotus alba Desr.	0	-	-	-	-
M. officinalis (L.) Lam.	0	-	-	-	-
Trifolium aureum Poll.	-	-	-	0	-
T. hybridum L.	-	-	-	0	-
T. pratense L.	s	-	-	-	-
T. repens L.	s	-	-	0	-

	Collection Areas				
	Rogers Pass	Cougar Valley	Fidelity Mtn.	Beaver R. Valley	Beaver R. Fen
Vicia sp. (vegetative)	s	-	-	-	-
LENTIBULARIACEAE					
**Pinguicula vulgaris* L.	0	-	-	-	-
Utricularia intermedia Hayne in Schrad.	-	-	-	-	0
LILIACEAE					
Camassia quamash (Pursh) Greene	-	-	-	P	-
Clintonia uniflora (Schult.) Kunth.	0	0	-	s	-
Disporum hookeri (Torr.) Nicholson	-	-	-	0	-
Erythronium grandiflorum Pursh	0	s	0	-	-
Smilacina racemosa (L.) Desf.	0	s	-	s	-
Streptopus amplexifolius (L.) DC.	0	s	s	0	-
S. roseus Michx.	0	s	-	s	-
S. streptopoides (Ledeb.) Frye & Rigg.	0	s	s	s	-
**Tofieldia glutinosa* (Michx.) Pers.	-	-	-	-	0
Veratrum viride Ait.	s	s	0	-	-
**Zigadenus elegans* Pursh	-	0	-	-	0
ONAGRACEAE					
Circaea alpina L.	-	-	-	0	-
Epilobium alpinum L. var. *alpinum* (*E. anagallidifolium* Lam.)	0	-	0	s	-
var. *lactiflorum* (Haussk.) C.L. Hitchc.	0	0	-	s	-
E. angustifolium L.	0	s	s	s	s
E. latifolilum L.	0	0	0	s	-
E. luteum Pursh	-	0	-	-	-
E. watsonii Barbey var. *occidentale* (Trel.) C.L. Hitchc.	-	-	-	-	0

	Collection Areas				
	Rogers Pass	Cougar Valley	Fidelity Mtn.	Beaver R. Valley	Beaver R. Fen
ORCHIDACEAE					
Corallorhiza mertensiana Bong.	-	0	-	0	-
C. trifida Chatelain	-	-	-	0	-
Goodyera oblongifclia Raf.	s	s	-	-	-
Listera convallarioides (Sw.) Nutt.	-	-	-	0	-
L. cordata (L.) R.Br.	0	s	-	s	-
Platanthera dilatata (Pursh) Lindley ex Beck	s	-	-	-	0
P. hyperborea (L.) Lindley	-	-	0	-	0
P. stricta Lindley	0	0	-	s	-
PLANTAGINACEAE					
Plantago lanceolata L.	0	-	-	-	-
P. major L.	s	-	-	0	-
POACEAE					
Agropyron pectiniforme R. & S.	-	-	-	0	-
Agrostis alba L.	-	-	-	0	-
Aira praecox L.	-	0	-	-	-
Bromus carinatus Hook. & Arn.	-	0	-	-	-
B. ciliatus L.	-	-	-	0	-
B. inermis Leysser	0	-	-	-	-
Calamagrostis inexpansa Gray	0	-	-	-	-
Cinna latifolia (Trevir. ex Gopp.) Griseb.	-	-	-	0	-
Dactylis glomerata L.	-	-	-	0	-
Deschampsia atropurpurea (Wahlenb.) Scheele (*Vahlodea atropurpurea* (Wahlenb.) Fries)	0	0	-	-	-
Elymus glaucus Buckl. var. *jepsonii* Davy	-	-	-	0	-
Festuca rubra L.	-	-	-	0	-
Glyceria elata (Nash) M.E. Jones	0	-	-	-	-
Hordeum jubatum L.	0	-	-	-	-
Lolium perenne L.	-	-	-	0	-
Phleum alpinum L.	0	0	0	-	-

	Collection Areas				
	Rogers Pass	Cougar Valley	Fidelity Mtn.	Beaver R. Valley	Beaver R. Fen
P. pratensis L.	0	-	-	s	-
Poa alpina L.	-	0	0	-	-
P. cusickii Vasey var. *purpurascens* (Beal) Hitchc.	M	-	-	-	-
P. leptocoma Trin.	-	0	-	-	-
Trisetum cernuum Trin.	-	-	-	0	-
T. spicatum (L.) Richter	-	0	-	-	-
POLYGONACEAE					
Oxyria digyna (L.) Hill	0	-	-	-	-
Polygonum douglassii Greene var. *latifolium* (Engelm.) Greene	-	0	-	-	-
P. viviparum L. (*Bistorta vivipara* (L.) S.F. Gray)	-	0	-	-	-
Rumex acetosella L.	0	-	-	s	-
R. obtusifolius L.	0	-	-	-	-
PORTULACACEAE					
Claytonia lanceolata Pursh	0	-	0	-	-
Montia parvifolia (Moc. ex DC.) Greene	0	-	-	-	-
PRIMULACEAE					
Trientalis europaea L. subsp. *arctica* (Fisch. ex Hook.) Hulten	-	-	-	0	-
RANUNCULACEAE					
Actaea rubra (Ait.) Willd.	0	0	-	s	-
Anemone multifida Poir.	-	M	-	-	-
A. occidentalis Wats. (*Pulsatilla occidentalis* (Wats.) Freyn)	0	-	0	-	-
Anemone parviflora Michx.	-	0	0	-	-
Aquilegia flavescens Wats.	0	0	-	-	-
A. formosa Fisch.	0	-	-	-	-
Caltha leptosepala DC.	0	-	0	-	-
Delphinium nuttallianum Pritz. ex Walpers	0	-	-	-	-

	Collection Areas				
	Rogers Pass	Cougar Valley	Fidelity Mtn.	Beaver R. Valley	Beaver R. Fen
Ranunculus acris L.	0	-	-	-	-
R. eschscholtzii Schlecht.	0	-	0	-	-
R. uncinatus D. Don	0	-	-	s	-
Thalictrum occidentale Gray	0	-	-	-	-
Trollius laxus Salisb. var. *albiflorus* Gray	0	0	0	-	-
RHAMNACEAE					
Ceanothus velutinus Dougl. ex Hook.	-	-	-	0	-
ROSACEAE					
Amelanchier alnifolia Nutt.	-	-	-	0	-
Aruncus sylvester Kostel.	0	s	s	s	-
**Dryas drummondii* Richards.	-	0	-	0	-
D. octopetala L. subsp. *hookeriana* (Juz.) Hulten	-	-	0	-	-
Fragaria virginiana Duchesne var. *glauca* Wats.	0	-	s	s	-
Geum macropohyllum Willd.	0	-	0	s	-
Luetkea pectinata (Pursh) Kuntze	0	0	0	-	-
Potentilla diversifolia Lehm.	0	0	-	-	-
P. fruticosa L.	-	0	-	-	-
Rubus arcticus L. subsp. *acaulis* (Michx.) Focke	-	-	-	0	-
R. idaeus L. subsp. *melanolasius* (Dieck) Focke	0	-	-	-	-
R. parviflorus Nutt.	0	s	s	s	s
R. pedatus J.E. Smith	0	s	s	s	-
Sibbaldia procumbens L.	0	0	0	-	-
Sorbus scopulina Greene	M	-	-	-	-
S. sitchensis Roemer	0	s	s	s	-
Spiraea betulifolia Pall. var. *lucida* (Dougl. ex Greene) C.L. Hitchc.	-	-	-	0	-
S. densiflora Nutt. ex T. & G.	s	0	-	-	-

	Collection Areas				
	Rogers Pass	Cougar Valley	Fidelity Mtn.	Beaver R. Valley	Beaver R. Fen
RUBIACEAE					
Galium triflorum Michx.	s	s	-	0	s
SALICACEAE					
Populus tremuloides Michx.	s	-	-	0	0
P. balsamifera L. subsp. *trichocarpa* (T. & G. ex Hook.) Brayshaw	0	-	s	s	0
Salix arctica Pall.	0	0	0	-	-
S. arctophila Cock.	0	-	-	-	-
S. barclayi Anderss.	0	-	0	-	-
**S. candida* Fluegge ex Willd.	-	-	-	-	0
S. commutata Bebb	0	0	0	-	0
S. lasiandra Benth.	-	-	-	-	0
S. reticulata L. var. *nivalis* (Hook.) Anderss.	0	-	0	-	-
S. sitchensis Sanson in Bong.	0	-	0	-	-
S. vestita Pursh	0	0	-	-	-
SANTALACEAE					
Geocaulon lividum (Richards.) Fern. (*Comandra livida* Richards.)	-	-	-	0	-
SAXIFRAGACEAE					
Leptarrhena pyrolifolia (D. Don) R.Br. ex Ser.	0	-	0	s	-
Mitella breweri Gray	0	-	0	-	-
M. pentandra Hook.	s	0	-	s	-
M. trifida R.C. Grah.	-	M	-	-	-
Parnassia fimbriata Konig	s	0	0	-	0
**P. parviflora* DC.	-	-	-	-	0
Saxifraga adscendens L. var. *oregonensis* (Raf.) Breit.	M	-	-	-	-
**S. aizoides* L.	-	0	-	-	-
S. bronchialis L.	0	0	0	-	-
S. cernua L.	M	-	-	-	-
**S. cespitosa* L.	M	-	-	-	-

	Collection Areas				
	Rogers Pass	Cougar Valley	Fidelity Mtn.	Beaver R. Valley	Beaver R. Fen
S. ferruginea R.C. Grah.	0	-	0	-	-
S. lyallii Engler	0	0	0	-	-
S. mertensiana Bong.	0	-	-	-	-
S. occidentalis Wats.	0	0	-	-	-
**S. oppositifolia* L.	-	0	0	-	-
S. rivularis L.	-	-	0	-	-
Tellima grandiflora (Pursh) Dougl.	0	0	-	s	-
Tiarella unifoliata Hook.	0	s	0	s	-
SCROPHULARIACEAE					
Castilleja hispida Benth.	0	-	0	-	-
C. occidentalis Torr.	-	0	0	-	-
C. rhexifolia Rydb.	0	0	0	-	-
Collinsia parviflora Dougl. ex Lindl.	0	-	-	-	-
Mimulus guttatus DC.	-	-	-	-	0
M. lewisii Pursh	0	0	0	s	-
M. tilingii Regel	0	0	0	-	-
Pedicularis bracteosa Benth.	s	0	0	-	0
P. racemosa Dougl. ex Hook.	-	-	0	0	-
Penstemon ellipticus Coult. & Fisher	0	-	-	-	-
Verbascum thapsus L.	s	-	-	s	-
Veronica americana Schwein. ex Benth.	0	-	s	-	-
V. serpyllifolia L.	0	-	-	0	-
V. wormskjoldii Roem. & Schult.	0	0	0	-	-
TYPHACEAE					
Typha latifolia L.	-	-	-	-	0
URTICACEAE					
Urtica dioica L. subsp. *gracilis* (Ait.) Selander	0	-	-	s	-
VALERIANACEAE					
Valeriana sitchensis Bong.	0	s	0	-	-

	Collection Areas				
	Rogers Pass	Cougar Valley	Fidelity Mtn.	Beaver R. Valley	Beaver R. Fen
VIOLACEAE					
Viola glabella Nutt.	O	S	-	S	-
V. orbiculata Geyer ex Hook.	O	-	-	O	-
V. palustris L.	P	-	-	-	-
V. renifolia Gray	O	-	-	-	-

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